REMARKS

In the Office action dated December 20, 2005, claims 1-20 are pending, with claims 1, 10-12, 14-17, and 19 having been rejected, and claims 2-9, 13, 18, and 20 having been objected to (but allowable if rewritten in independent form). In this response, claims 16 and 17 have been amended to overcome an indefiniteness rejection. The rejection of claims 1, 10-12, 14-17, and 19 on the grounds of obviousness is traversed without need for amendment. Further examination and reconsideration respectfully are requested.

Examiner's Consideration of Applicants' Information Disclosure Statements

The examiner's acknowledgement of the Information Disclosure Statement filed on January 2, 2004 is noted with appreciation.

Examiner's Acceptance of the Drawings

The examiner's acceptance of the drawings filed on January 2, 2004, is noted with appreciation.

Claims 16 and 17 Have Been Amended to Overcome the Rejection Under 35 USC §112

Claims 16 and 17 were rejected under 35 USC §112 as being indefinite because of the use of the term "appreciable overshoot." Claim 16 has been amended by deleting the phrase containing the term "appreciable" and substituting –flat top current pulse–. Claim 17 has been amended by deleting the term "appreciable overshoot" and substituting –overshoot in the beginning–. Both changes are precisely supported by Paragraph [0052] of the published application (Publication No. 2004/0160996), which is as follows (emphasis supplied).

> [0052] FIG. 11 shows that the fast voltage was increased to generate the overshoot in the current waveform. The fast and slow voltages can be

adjusted independently. ***If the fast voltage is increased more than needed to generate a flat top current pulse, a current pulse with an overshoot in the beginning is obtained.*** This might be advantageous for an application in which the light from a laser diode is being used to trigger a photoconductive switch, for example.

Applicants are of the view that one of ordinary skill in the art would have no difficulty whatsoever comprehending the meaning of "flat top current pulse" and "overshoot at the beginning" in view of the language of Paragraph [0052] and the waveform of FIG. 11, taken in the context of the rest of the detailed description. Applicants respectfully submit that claims 16 and 17 as amended are not indefinite.

The Rejection of Claims 1, 10-12, 14-17 and 19
Under 35 USC §103 is Traversed

Claims 1, 10-12, 14-17 and 19 were rejected under 35 USC §103 as being obvious over US Patent No. 5,708,676 issued to Minamitani et al. The rejection is traversed without need for an amendment.

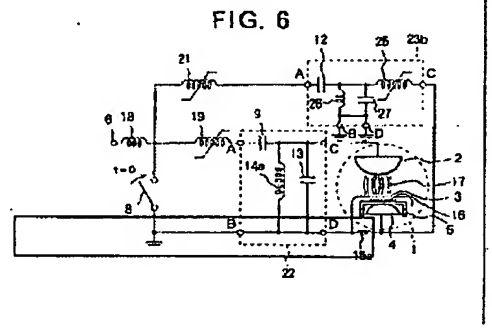
A finding of obviousness requires that three basic criteria be established. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. See MPEP § 2142, Eighth Edition, Rev. 3, August 2005, page 2100-134. Applicants respectfully submit that Minamitani et al. contains no suggestion or motivation to modify its disclosure to achieve the claimed invention, and that even when modified as suggested by the examiner, Minamitani et al. neither teaches nor suggests all of the claim limitations.

While there are many differences between the Minamitani et al. disclosure and the claimed invention, applicants' position may be explained with discussion of just a few of the more notable differences. The next paragraph reviews that part of the disclosure of Minamitani et al. applied in the Office action, and subsequent paragraphs discuss the differences and why the claimed invention is not obvious.

Minamitani et al. "is concerned with a pulse generating circuit ***destined for use in such [excimer-type] discharge excitation type pulse laser apparatus.***" Minamitani et al., column 1, lines 9-11 (emphasis supplied). The rejection is over FIGS. 6 and 7 of the reference. As shown in FIG. 6, the laser chamber 1 is a three terminal device having a first main discharge electrode 2, a second main discharge electrode 3, and an auxiliary electrode 4. The second main discharge electrode 3 is grounded, as approximately indicated by the circuit portion contained in the box in first annotated FIG. 6 below.

FIRST ANNOTATED FIG. 6

FIG. 6



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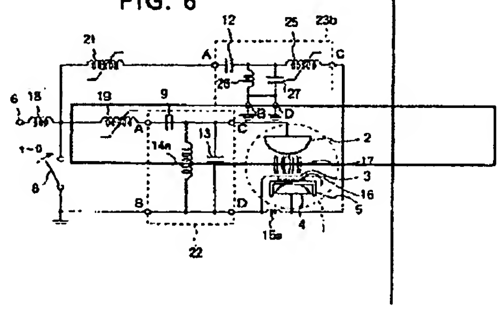
The first main discharge electrode 2 has its voltage controlled by a separate circuit that includes reactor 19, charging capacitor 9, and charge transfer capacitor 13, as approximately indicated by the circuit portion contained in the box in second annotated FIG. 6 below. The voltage on the first main discharge electrode 2 relative to ground (i.e. the second main discharge electrode 3) is shown by trace 1 in FIG. 7.

SECOND ANNOTATED FIG. 6

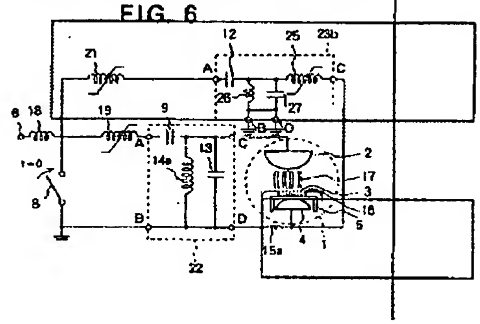
FIG. 6



The auxiliary electrode 4 has its voltage controlled by a separate circuit that includes reactors 21 and 25, charging capacitor 12, and charge transfer capacitor 27, as approximately indicated by the circuit portion contained in the boxes in third annotated FIG. 6 below. The voltage on the auxiliary electrode 4 relative to ground (i.e. the second main discharge electrode 3) is shown by trace 2 in FIG. 7.

THIRD ANNOTATED FIG. 6

FIG. 6



In operation, a single voltage source 6 charges both the charging capacitor 9 in the first main electrode voltage control circuit, as well as the charging capacitor 12 in the auxiliary electrode voltage control circuit. When the charging capacitors 9 and 12 are charged, the switching device 8 is fired. Then, the charging capacitor 12 in the auxiliary electrode voltage control circuit discharges to establish a voltage on the auxiliary electrode 4 as shown by trace 2 to promote pre-ionization by the corona discharge 16, while the charging capacitor 9 in the first main electrode voltage control circuit discharges to establish a voltage on the first main discharge electrode 2 as shown by trace 1 to inject energy into the main discharge path 17.

One difference between Minamitani et al. and the claims is that Minamitani et al. "is concerned with a pulse generating circuit ***destined for use in such [excimer-type] discharge excitation type pulse laser apparatus***." Minamitani et al., column 1, lines 9-11 (emphasis supplied). In contrast, claim 1 includes a laser diode limitation, claim 14 includes the limitation of discharging into a laser diode, and claim 19 includes a means for discharging into a laser diode. As explained in detail in the next paragraph, the loadlines and impedances are completely different, so that there would be no suggestion or motivation for one of ordinary skill to use the circuit disclosed by Minamitani et al. to drive a pulsed laser diode.

While the examiner acknowledges this difference, the examiner writes that "a laser diode would be an obvious type of laser to use with the disclosed circuitry [disclosed by Minamitani et al.] since laser diodes are well known in the art. " This reasoning inherently assumes that the characteristics of a laser diode are similar to the characteristics of an excimer-type discharge excitation type pulse laser apparatus. However, this is not so. The load of the gas discharge excitation type laser prior to discharge is a high impedance load. Hence, the circuit disclosed by Minamitani's et al. is concerned with increasing the steepness of the voltage rise applied to the electrodes of the gas discharge excitation type laser; for example, all of the traces shown in Minamitani et al., namely FIGS. 2, 4, 7, 9, 13, 18 and 19, are voltage traces. In contrast, a laser diode presents a very low impedance load in the micro-ohm to milli-ohm range (which is a factor of one thousand to one million times less than the impedance of a gas

discharge tube), so that the driver circuit for a laser diode is concerned with increasing the steepness of the current rise; for example, all of the traces shown in the present application, namely FIGS. 3, 10, 11, 12, 14, 15 and 16, are current traces. Furthermore, the electrical load presented by a gas discharge tube as disclosed by Minamitani et al. transitions from an open circuit (infinite impedance) to several ohms after the discharge, and may also transition from a positive to a negative resistance depending on the relative forward current. This is typical behavior with glow discharges, plasmas, arcs, and the like. In contrast, a semiconductor laser diode load exhibits an impedance that does not change by an order of magnitude during the current pulse, but which instead can be thought of as a simple voltage source of 1-3 volts in series with the diode resistance. Since the loadlines and impedances are completely different, there would be no suggestion or motivation for one of ordinary skill to use the circuit disclosed by Minamitani et al. to drive a pulsed laser diode.

A second difference between Minamitani et al. and the claims is that the gas discharge excitation type laser disclosed by Minamitani et al. actually presents two independent loads that must be driven, one load being the first main discharge electrode 2 and the other being the auxiliary electrode 4. As explained above in connection with Second Annotated Fig. 6, the first main discharge electrode 2 presents a first independent load that is driven by a first separate circuit that includes reactor 19, charging capacitor 9, and charge transfer capacitor 13. As explained above in connection with Third Annotated Fig. 6, the auxiliary electrode 4 presents a second independent load that is driven by a second separate circuit that includes reactors 21and 25, charging capacitor 12, and charge transfer capacitor 27. In contrast, claim 1 recites that the laser diode, which presents a single load, is controllably coupled to the first energy storage element AND to the second energy storage element, claim 14 recites that the first energy storage element AND the second energy storage element are discharged into the laser diode, and claim 19 recites means for discharging the first energy storage element AND the second energy storage element into the laser diode. Since Minamitani et al. concerns driving two independent loads and respective separate circuits, there is absolutely no teaching or suggestion of driving a single load with the two circuits. If the circuits are taken individually, neither meets the limitations of the claims.

A third difference between Minamitani et al. and the claims is that the circuit disclosed by Minamitani et al. uses a single voltage source 6 to charge both the charging capacitor 9 in the first main electrode voltage control circuit, as well as the charging capacitor 12 in the auxiliary electrode voltage control circuit. Hence, both charging capacitors 9 and 12 are brought to the same voltage magnitude. In contrast, claims 1, 14 and 19 all recite that the second voltage magnitude is greater than the first voltage magnitude. The limitations of independent claims 1, 14 and 19 are therefore not met by Minamitani et al., and there is absolutely no teaching or suggestion to modify Minamitani et al. to meet these limitations, nor any motivation for doing so.

As independent claims 1, 14 and 19 are not obvious over Minamitani et al. for at least the three reasons explained above, the rejection of the independent claims should be withdrawn and the claims should be passed on to allowance. All claims dependent from these independent claims are allowable as well, since they include all of the limitations of the independent claims from which they depend and are patentable for the same reasons as set forth above. Moreover, while these dependent claims may recite additional limitations of independent patentable significance, discussion of their independent patentability is moot in view of the remarks made in connection with the independent claims.

Conclusion

In view of the foregoing remarks and amendment, it is believed that the application is now in condition for allowance. Applicants respectfully request favorable reconsideration and the timely issuance of a Notice of Allowance. If a telephone conference would be helpful in resolving any issues concerning this communication, please contact the undersigned at (952) 253-4135.

Respectfully submitted,

Altera Law Group, LLC
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Date: March 20, 2006 By: David H. Carroll
Reg. No. 29,903
DHC/mar